

17
PUBLIC HEALTH ACT.

(11 & 12 Vict., Cap. 63.)

R E P O R T

TO THE

GENERAL BOARD OF HEALTH,

ON A

P R E L I M I N A R Y I N Q U I R Y

INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF
WATER, AND THE SANITARY CONDITION
OF THE INHABITANTS

OF THE TOWNS OF

MARKET HARBOROUGH, GREAT BOWDEN,
AND LITTLE BOWDEN.

BY WILLIAM LEE, Esq.,

SUPERINTENDING INSPECTOR.



L O N D O N :

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NOTIFICATION.

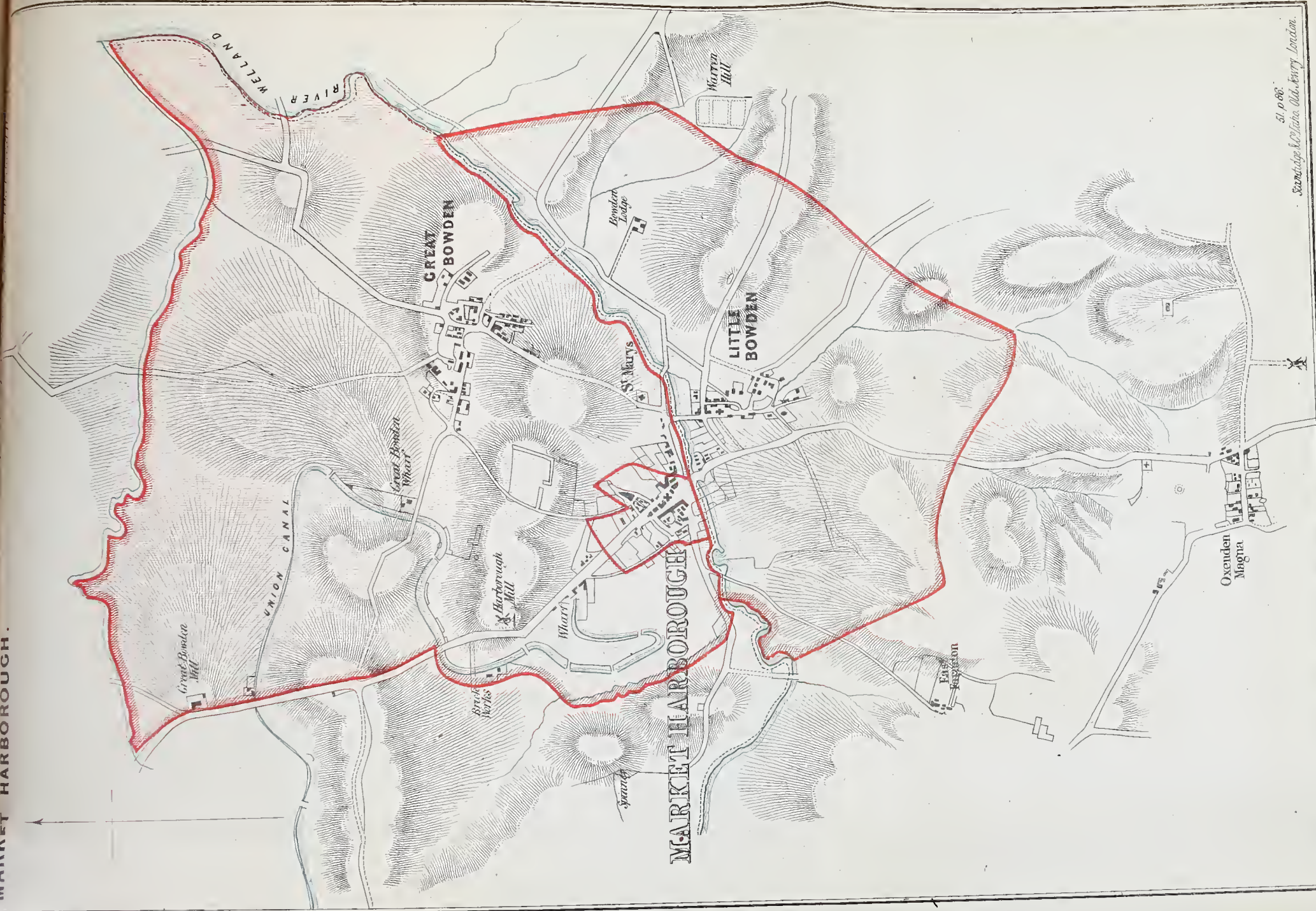
THE General Board of Health hereby give notice, in terms of section 9th of the Public Health Act, that on or before the 27th June written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the inhabitants of the Towns of MARKET HARBOROUGH, GREAT BOWDEN, and LITTLE BOWDEN, or with respect to any amendment to be proposed therein.

By order of the Board,

HENRY AUSTIN, *Secretary*

Gwydyr House, Whitehall,

May 24, 1849.



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PUBLIC HEALTH ACT (11 & 12 VICT., Cap. 63).

Report to the General Board of Health on a Preliminary Inquiry into the Sewerage, Drainage and Supply of Water, and the Sanitary Condition of the Inhabitants of the Towns of MARKET HARBOROUGH, GREAT BOWDEN, and LITTLE BOWDEN. By WILLIAM LEE, Superintending Inspector.

Gwydyr House, March 3, 1849.

MY LORDS AND GENTLEMEN,

IN commencing this Report I think it well to premise that although the parishes of Market Harborough and Great Bowden in the county of Leicester, and of Little Bowden in the county of Northampton, have petitioned *severally* for the application of the Public Health Act, I feel it my duty, after careful inspection and consideration, to recommend that the three be united into one district. My reasons for so doing will be fully stated hereinafter.

GENERAL CONTOUR OF THE SITE WITH RESPECT TO SURFACE DRAINAGE.—The river Welland, which divides the counties of Leicester and Northampton, is from 20 to 25 feet wide. It takes its rise about six miles to the west of Market Harborough, and consequently drains a considerable tract of country.

Its course is for some distance rapid, but near the town and to the east the valley opens out and becomes comparatively level. On its northern bank stands the town of Market Harborough, the principal street of which, about 600 yards long, is at right angles to the river. The general slope of the town is about 1 foot in 25 yards, but as the river-channel is not deep, and as a portion of the town lies in the valley, all the houses between the river and the sheep-market are only from 4 to 5 feet above the bed of the stream. The section of the town is therefore, like that of the Welland, a vertical curve, bringing down the upland waters rapidly, and then losing much of its velocity: the lower portion of the town is in consequence occasionally inundated.

The whole jurisdiction of Market Harborough is contained in about 15 acres of land, almost entirely built upon.

Great Bowden is an extensive parish. The populous villa from which it derives its name is about a mile from Marl Harborough, and yet that town is enclosed, except on its ri boundary, by the parish of Great Bowden.

That portion of Great Bowden which lies to the west slo down to the Welland, that on the north side of Harborou continues to rise with a slightly increased inclination to a *water-shed* a little above the Harborough windmill, about mile from the river. This line of water-shed turns south-e for nearly a mile, until it comes within about a quarter o mile of the river Welland, where it falls off to the south. T two sides occupy about a square mile; half of the draina water is shed towards Market Harborough, and the remain into a brook on the south-west side of the village of Gr Bowden.

The greater part of the village of Little Bowden is situa in the valley of the Welland, and is consequently subject to undations, beside which, a brook with a very circuitous co passes through it, carrying the drainage water of nearly ei square miles of agricultural land, and presenting a sect similar to those already described.

GEOLOGICAL STRATA AS AFFECTING THE RETENTION MOISTURE.—The superficial soil of the district is a fine lo varying from 1 to 2 feet deep, and capable of being made v fertile under improved arrangements. The subsoil in valley, within the ancient influence of the Welland, is a str retentive clay; but at about an average of 250 yards from river it changes to diluvial gravel and sand, becoming gradu thicker until it reaches 16 feet deep. There are no rocka the district. The soil and subsoil are almost without any ception surcharged with moisture, although perfect drain would be easily effected.

The rain-fall about four miles distant, at the reservoir longing to the Union Canal Company, is 26 inches an average. Drain-tiles are stated to be used, and circular pi to some extent; but I am sorry to say that I met with person who could give me information as to the nature or extent of the land drainage practised. I am convinced f my own observation that the drainage is most imperfect, an met with no difficulty in obtaining evidence on that side of question. One gentleman of influence, George Seabroke, B of the Grange, Great Bowden, says,

“I have no doubt that the health of the inhabitants is injur affected by the damp state of the subsoil, and the general wa drainage; causing among other evils a constantly humid state of atmosphere.”

The Rev. Richard Miles Matthews says,

“Fogs are very prevalent in the evenings, near the river especially.”

The Feoffees gave as a reason why they did not more frequently dispose of the refuse in their laystall, that *manure could only be applied at one period of the year*, and in the course of the inspection I saw multitudes of damp houses, many with moss growing on the external walls, and in the suburbs trees, wooden palings, and brick walls covered with mosses and lichens, all proving the existence of excessive moisture.

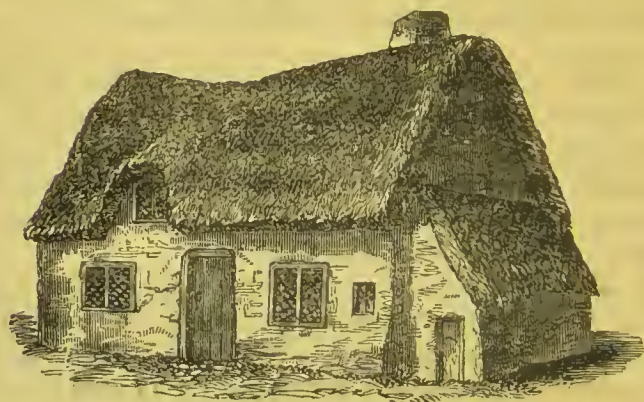
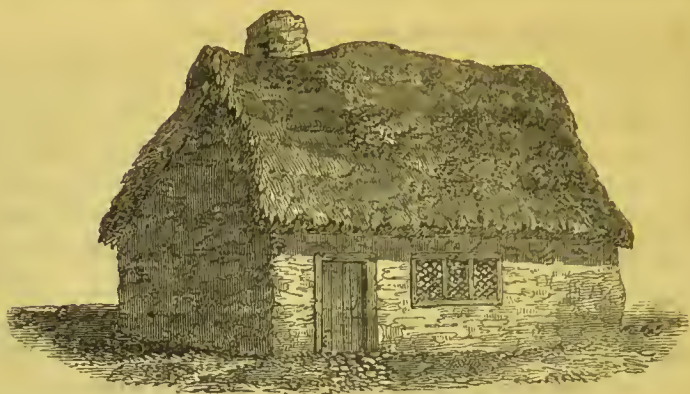
Prevalent winds and their effects.—The prevalent winds are westerly, but the place is so situated that in almost any direction of the wind some part of the district is affected by the offensive emanations of the river Welland.

POPULATION AND RATE OF INCREASE.—The population of Market Harborough at the census of 1831 was 2188; in 1841, 433: of Great Bowden in 1831, 1204; in 1841, 1265: of Little Bowden in 1831, 350; in 1841, 435:—the rate of increase being, Market Harborough 11 per cent., Great Bowden 11 per cent., Little Bowden 21½ per cent.

Number of houses, population per house, &c.—The number of houses in Market Harborough, according to the census of 1841, was 478, being an average of 5·09 inhabitants per house; Great Bowden 265, being an average of 4·77 per house; Little Bowden 92, being an average of 4·73 per house. But few houses appear to have been lately erected in Great Bowden.

Overcrowding among the lower classes.—There are instances of overcrowding in Market Harborough and in Little Bowden, but these sink into insignificance when compared with a portion of Great Bowden. In this place there are 42 cottages, or rather hovels, *belonging to the parish*; 12 are constructed of brick, and 30 of mud and thatch; they were most of them erected upon the waste by labourers, who becoming subsequently chargeable to the parish were relieved, and their cottages taken as repayment by the overseers. They are now let at nominal rents to labourers having a settlement in the place, *reference being given to those having the largest families, in order, as I am informed, to keep them from the parish.*

These houses are nearly all quite unfit for human habitations, have no drainage or proper water supply, are surrounded by manure heaps and stagnant refuse, and constitute most appalling aggregations of filth, misery, and demoralization. I append sketches of two of them:—



I feel constrained to lay before the Board *a small portion* of the evidence obtained on my inspection of these houses shewing their overcrowded and unhealthy condition.

Joseph Wilford.—“I live in one of the workhouse cottages. Have wife and seven children at home. The eldest a son 21 years of age son 19, daughter 16, son 12, son 9, son 1 $\frac{1}{2}$. Am a labourer with donkey and cart. My house contains a living room, small pantry, *two small lodging rooms*. Pay 5*d.* per week rent. No rates.”

Benjamin Kendall's wife.—“My husband is a labourer. We have eight children at home. A daughter aged 19, son 17, son 14, son 9, daughter 9, daughter 4, son 2, son 6. *We have one living-room one sleeping-room*. Pay 4*d.* per week rent and no rates.”

Thomas Carter's wife.—“My husband is a labourer. We have eleven children at home, and pay 4*d.* per week rent. No rates. Our house contains a living-room and *two small sleeping-rooms*. We have one 9 years old in a decline. The ages of the children are as follows: a daughter 19, son 18, son 17, two daughters 15, son 12, son 9, two sons 8, son 6 months.”

COMPARATIVE MORTALITY.—It has been usual to compare the rate of mortality in a registration district comprising a small town surrounded by a rural population like Market Harborough.

rough, with that of a large town like Leicester, and on such comparison the inhabitants of the former find cause of congratulation in the superior healthfulness of their district. I am sorry to say that there is another side of the question, calculated to dispel such feeling of satisfaction, and to show the existence of a great *excess* of sickness and mortality in Market Harborough.

The average age of all who die in the parish of Great Bowden is 45 years and 9 months. In the whole registration district of Harborough, it is 36 years and 3 months, but in the town of Market Harborough it is only 33 years and 10 months.

Again, the average age of all who die *above twenty years* is, in Great Bowden, 60 years and 4 months. In the whole of the Harborough registration district 59 years and 10 months; but in the town of Market Harborough only 56 years and 3 months.

The fallacy, therefore, of supposing the town of Market Harborough to be very healthy, consists in the fact that in taking the average duration of life to all who are born in the district, the inhabitants of Great Bowden appear to die $9\frac{1}{2}$ years sooner than is really the case, while the whole of the inhabitants of the town of Market Harborough appear to live 2 years and 5 months longer than they actually do.

We are brought, therefore, to the inevitable conclusion, that, compared with Great Bowden, *all who are born* in Market Harborough lose upwards of 11 years of their lives; that all who die above 20 years lose upwards of 4 years of their lives; and that, when compared with the whole of the Harborough registration district, all the inhabitants of the town of Market Harborough lose 2 years and 5 months of their lives, while those who die above the age of 20 lose 4 years and 1 month.

It would be easy to make out an account of the value of the labour thus lost, viz. four years' wages for each adult; and next of the aggregate cost of sickness accompanying this excess of mortality, the average being found, on extensive inquiry throughout the country, to be 28 cases of sickness, costing 1*l.* each, to every death. To this we must add the cost of an excess of funerals, at only 5*l.* each on the average.

And then append the subsequent charges on the poor rates on account of widowhood, orphanage, &c., and we shall find that the town of Market Harborough is at the present time paying a much larger sum annually for *preventible sickness and mortality* than it would be called upon to contribute during the same time for the sanitary works necessary to improve its condition.

I am happy to say that there appears no essential reason why the mortality in the town of Market Harborough should

be higher than that of the parish of Great Bowden; nay there is every reason to believe that the introduction of the Public Health Act would still further lower the mortality of *Great Bowden*, and that then the two places might be equally healthy.

The same remarks would apply to Little Bowden: I have omitted it in these comparisons solely on account of its small population.

Endemic diseases very prevalent.—Endemic diseases exist in almost every court in Market Harborough, in the adjacent parts of Great Bowden, and in the more densely populated portions of the entire district.

Epidemic diseases.—Epidemics occasionally burst out upon confined spaces with fatal effect.

At the *Bridge House* in Little Bowden, immediately across the river Welland, three persons died, in the year 1847, from fever. *The front wall of the house is quite green with vegetation.*

In *Bowden Lane* are some houses, of which Mr. Wartnaby is mortgagee in possession: they are without any other convenience than a tub placed in a recess. In Green's property the same, and, in addition, the surface covered with fish offal and other refuse, standing in pools, and percolating into the pump well that contains their only supply of water. In Garlick's property, privy refuse is heaped six feet high against a panting wall, on the other side of which a poor woman has shelves for keeping her victuals.

In all these places Dr. Wright stated constant low fever to exist.

In *Sulley's Yard*, *Coach and Horses Yard*, and numerous other places, similar causes produce similar effects. The notes of my inspection afford details which would swell this Report to an unnecessary length. They are repetitions of the facts that in Harborough and its vicinity, as in all other places to which inquiry has been directed, the seat of epidemic and endemic diseases is in the midst of filth, stagnant for want of drainage, proper supplies of water, and other sanitary arrangements.

Before leaving this part of the subject I feel constrained to add one other example of the connection between disease and stagnant refuse. *Bowling Green Row* consists of 10 back-to-back houses. Mary Cort, one of the occupants, states,—

“My house is very bad. My son has had a fever. I have very bad health. Nearly all the occupants of the row are sick. My house walls are damp. There is a great cesspool in front which receives all the refuse of the houses. It was stopped up some time since, and was then opened, but not emptied; the refuse was only removed from the ends of the drains. I pay 1s. 6d. per week rent.”

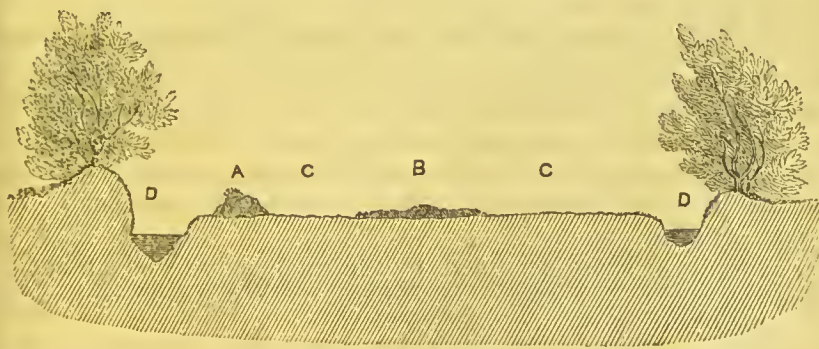
I observed that on one side of the row, containing five houses

no less than three females had flannels and bandages under their chins, and found that they were all suffering from *tic douloureux*.

Dr. Wright states that all the inhabitants of these houses are sick; that their complaints vary with the direction of the wind, the season of the year, the state of the atmosphere, &c.; and that bilious complaints, diarrhœa, low fever, rheumatism, and severe pain in the nerves of the face, almost at times amounting to *tic douloureux*, always affect some of the occupants.

In speaking of another very unhealthy court, *Quakers' Yard*, the doctor expressed his conviction that nearly one-half of the disease of this and similar localities (which are numerous) in the town was capable of removal.

Condition of the roads.—The principal street through Market Harborough and Little Bowden, formerly the high road from the metropolis to the North, is kept in a good condition. Lubenham Lane, Kettering Road, and the road leading to the village of Great Bowden, are repaired, but in a very inferior and wasteful manner. In any general description there will of course be exceptions as to some particular points in certain localities. I select Billy Boy's Lane in Little Bowden as exhibiting the defects, some of which are found in every one of the roads repaired by the local authorities, with the exception of the main road already alluded to. The following is a sketch of a transverse section:—



Width between the fences, 42 feet. A, black stinking solid matter thrown out of the ditch, and left. B, the only passable roadway for both foot-passengers and carriages, 8 feet 6 inches wide, thin, weak, and elastic, and consequently about twice as expensive in its maintenance as a good, substantial, well-drained road, and causing a double resistance to loaded vehicles. C C, soft evaporating surface receiving the refuse washed and scraped off from B, and thrown out of D D, which are ditches about two feet deep, and are complained of as being very offensive. There is, therefore, on this road land 11 yards wide and some hundreds of yards in length, *worse than wasted*.

LAND DRAINAGE.—In the Report published by the Metropolitan Commission of Sewers on Suburban Land Drainage are some statements very applicable to this and to a large proportion of the roads in Market Harborough, Great Bowden and Little Bowden. The Commissioners state that—

“Covered tubular drains, such as we propose as substitutes for the open ditch, would of themselves effect extensive land drainage; and: some suburban lands, closely intersected with by-ways and public foot paths, which should be deep-drained, would sometimes supersede the necessity of any other drainage.

“Mr. Parkes mentions an instance of one drain, from 5 to 7 feet deep, which drains a field of about 20 acres. The road drains would commonly serve as excellent outfalls for the drainage of the land; and Mr. Parkes and other land-surveyors think it would be a great advantage to the farmers if they had the right of carrying drains into them.

“On a mile of road, having ditches on both sides, the extent of evaporating surface of stagnant moisture with decomposing vegetable and animal life, would be from three quarters to an acre per mile; that in three quarters of an acre in extent could be gained as dry road, or as cultivable land.

“Generally speaking, by proper drainage, the low and wet lands may certainly be advanced in value from 25 to 50 per cent.

“The effect of deep tile drainage of the roads in those parts would be, first, to get rid of the dreadful stench of the stagnant water and rotted vegetables in the ditches, which is at times enough to make any man sick, and does so. The health of the population would therefore be greatly improved by it. In the next place, the roads would be easily kept in repair because they would become more solid.

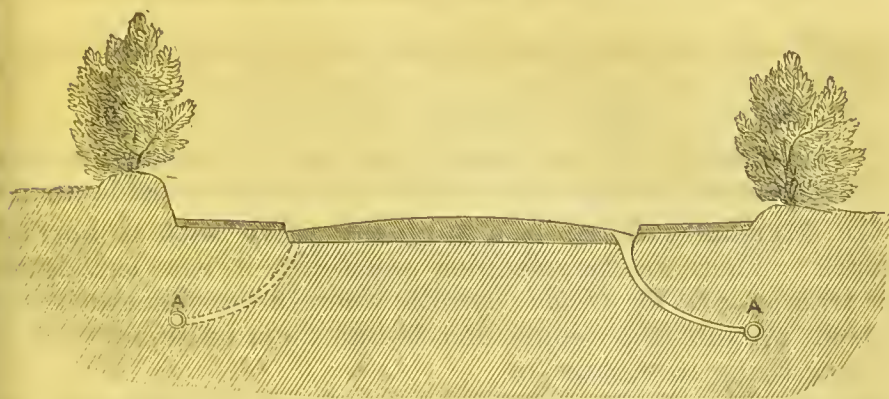
“At the height at which the water stands in those ditches—very often within a foot of the adjoining surface (sometimes higher)—it keeps the road soft, and the land adjoining much wetter than it ought to be, often a quag.

“Will not the extension of the road drainage be of peculiar advantage in the case of small ownerships, or small occupiers?—No doubt it will be of very great advantage.

“In general the space occupied by the ditch may be advantageous: added to the road. In other cases where there is a sufficient width of road, it might be given to the land.

“It has been estimated by experienced surveyors that with 2-inch tubular drains, and pipe-shoots connecting the drains with the surface the drainage of a road may be effected at 36*l.* 5*s.* per mile, and with 3-inch drains at 42*l.* 17*s.* per mile. For this outlay the roads would be maintained dry and in a good condition; and the adjoining fields would be drained to a considerable distance without any other drainage work as well as provided with mains to receive the outfalls of the field drains.”

With these improvements, the road in question, and all the others now in a similar condition within the district of Market Harborough, would have a transverse section similar to the following diagram:—



Advantages of Suburban Road Drainage.—Without occupying space in description, the advantages of this arrangement to the district of Market Harborough are—1. That the original outlay would be trifling. 2. That all the expense of periodic cleansing of the ditches would be saved. 3. That the roads would be kept in much better repair at a greatly reduced cost. 4. That the draught of carriages passing thereon would be much less, and consequently a horse would either draw the same load more easily, or remove without additional exertion a much greater. 5. That the health of the inhabitants would be improved by getting rid of the noxious smells from decayed matter, and by the removal of humidity from the atmosphere. 6. That the farm lands on each side would be drained for a considerable distance without any additional expense by the pipes A A. 7. That outlets at a sufficient depth would be obtained for efficient land drainage upon the farms in the neighbourhood where the soil and subsoil is now saturated with moisture. And 8. That this land drainage would to that extent increase the value of the farms from 25 to 50 per cent.

Evils of existing jurisdictions.—Many of the public roads are scarcely repaired at all; some because they are in the parish of Great Bowden, but are used almost exclusively by the inhabitants of Market Harborough; others because they are partly in one and partly in the other; and some, situate in both parishes, because they are private roads, and the authorities of neither parish take any interest in having them dedicated to the public. The Reverend William Scarborough, Incumbent of Harborough, states that—

“These divisions lead to much inconvenience, because I believe the parishes of Great Bowden and Harborough cannot agree as to the repair. It would be a great good if they were united into one district.”

Mr. Joseph Brown, Townsman of the Feoffees, says in his evidence—

“We have no jurisdiction whatever on private property.”

There seems to be a general absence of any arrangements for the removal of refuse from private property. I was informed that large quantities of night-soil are carried in tubs,

and poured over the parapet-wall of the bridge into the river Welland.

Mr. William Andrews, solicitor, complained,—

“That a number of houses opposite the John Bull malting-house have no back premises, and were compelled to put all their refuse in front.”

In Marshall's Yard is a stagnant privy with a horrible stench. There are two sleeping-rooms over it, used as lodging for tramps, and for *Union vagrants* when the workhouse is full. I went up into the rooms, and found them quite unfit for human being to breathe in.

At the Upper Green in Great Bowden is a number of *mu hovels*, part of those already described as belonging to the parish. One of these rows, almost in a falling condition, has a large pond behind it, the odour from which is perceptible 20 or 30 yards distant. The water and filth of this pond lie against and soak into, the mud-walls of the houses. The following is the evidence of Thomas Kendall's wife, one of the occupants:—

“My husband and I have resided here nearly eight years. We have no privies, but are obliged to use pots and empty them through the window into the pond. Four houses do this and have done it for years; it is the only way we can get quit of it.”

Large manure heaps, lying upon the public highways, are common in all the three parishes.

Joseph Harding, stocking-weaver, residing in one of the parish houses, says,—

“There are dunghills in the yard, and very offensive smells arise from them. Two privies are built against the house of one of my neighbours with only accommodation for two persons at a time, but they are the only conveniences for 50 or 60 persons. I have bad health, and am sure that the condition of the place where I live is the cause of it. It would be a great blessing to the poor people about here if their houses were less damp, and these privies, dunghills, and refuse removed.”

Mr. William Symington complained that in front of a house belonging to him and occupied by Mr. Latchmore, in the principal street, near the corn-market, ashes and privy soil were regularly deposited, and only removed once a week.

Mr. Jabez Spriggs and Mr. John Jarvis complained, as trustees of the Wesleyan chapel, of dunghills and stagnant liquid refuse in front of the chapel.

Entire absence of any deep drainage of the sites of buildings.—We have already alluded to the defective suburban land and road drainage, but the greatest evil in this district is the entire absence of any system of deep drainage of the sites of the buildings.

Mr. Joseph Brown, Townsman of the Feoffees, says in his evidence,—

“There is no drain in the town sufficiently deep for the effectual drainage of the basements of the buildings.”

W. de Capell Brooke, Esq., J. P., informed me that the cottages in Harborough are entirely without cellars. He should think there is not one in the town.

In many parts of the town mosses are growing on the external walls of the houses: in Lodging House Yard I found it reaching nearly two feet high above the ground. On inquiry in one of these houses occupied by William Cort, his wife said,—

“We have always some of the family ill; the house is always very damp. The drainage is very bad. There are people sick in most of the houses in the yard.”

At Great Bowden, Mr. William Shepherd, butcher, complained of a large pond and extensive open ditches in front of his premises. He states,—

“They are very offensive in summer when the water is low. It would be a great advantage if at least part were filled up. I think the drainage of the whole neighbourhood is very bad.”

There is no appearance in the inhabited part of Little Bowden of any house or road drainage.

Mr. William Gilbert complains of the want of drainage near his property in Flavell's Road.

The Reverend Richard Miles Matthews, curate of Great Bowden, says in his evidence,—

“The majority of houses in Great Bowden could not have deep cellars.”

The Reverend William Scarborough says,—

“I have noticed that many of the houses are damp, and the walls have settled down; some are cracked.”

Dr. Wright, in his evidence, says,—

“The general character of the diseases here depends much upon the humidity of the atmosphere. There is but little inflammatory disease. The diseases arise principally from the blood being poisoned, from the secretions not being separated naturally; and principally the liver. The number of cases of the same kind doubles directly on the occurrence of cold and wet weather. Floods, dampness, fogs, and want of drainage are the causes of a great part of the diseases prevailing here.”

TOWN DRAINAGE.—In Market Harborough alone has any attempt been made at public drainage. The main sewer, extending from the river through the town, varies from 2 to 3 feet in diameter, and from $3\frac{1}{2}$ feet to 6 feet from the surface of the road to the bottom. Four smaller public drains fall into it, at a depth of $1\frac{1}{2}$ feet to 2 feet from the surface. Some private surface-drains fall into these, sufficient to produce at every grate and opening, trapped or otherwise, the faint, sickly foetor which those only who are acquainted with it know how to appreciate. The main sewer, Mr. Brown informs me, is frequently flushed with water from the Folly Pond, a small reservoir constructed above the town for that and other purposes.

In six or seven places between the pond and the river are openings where sluices can be put down to back up the water for use in cases of fire. The whole of the public drainage under the management of the Feoffees.

Mr. Thomas Hinde, in his evidence, says—

“ I am one of the Feoffees of Market Harborough. The principal culvert of the town was made before the present feoffees were appointed but I know, as a fact, that the present drains have been entirely constructed without any plans, levels, or sections.”

State of the River Welland in the vicinity of the Town.—The whole drainage of the town falls into the River Welland, near the bridge, at the principal road, polluting the stream, and constituting a fruitful source of miasma and disease.

In a History of Market Harborough, by Mr. W. Harrold published in 1808, it appears that—

“ Some years ago the Welland was well stocked with pike, perch, chub, roach, dace, gudgeon, and eels, equal to any in the kingdom, but now, alas! (the author adds) not only the fish are choked, but the river also, for its waters are shallow and so overgrown with rushes, as most parts of it to be—*instabilis tellus, innabilis unda.*”

The present state of the river is admitted on all hands to be filthy and injurious to health; every change of the wind alters the direction of the effluvium, and carries it with striking effect to the senses of some portion of the inhabitants, in all states of the weather, and at all periods of the year; worse of course in the summer season than at other times. It is not obstructed below the outfall of the drainage by any mill-dam or weir. There is a small weir above the bridge, about 18 inches head, to convey water to the engine of the factory; but this is not a serious obstruction. A good deal of warp exists near the bridge, and the present drainage outfall, being just below that point, is half full of mire, with an addition of water reaching within 12 inches of the key-brick.

Mr. Samuel Watson Cox states in his evidence—

“ The town is subject to floods: the cellars will be inundated, and the surface occasionally covered nearly up to the church. At the sheep market it has been known 2 feet 6 inches deep; that is not frequent. Floods have an injurious effect in closing up the outlet of the sewer, and forcing out the noxious gases through the gullies and gratings.”

The Rev. W. M. Matthews says, with reference to the stench from the river—

“ When I was Curate of Dingley, to the east of Great Bowden, I used to say that I could always tell, if blindfolded, when I came to St. Mary's Bridge.”

PRESENT SUPPLY OF WATER.—The present supply of water for domestic purposes is by wells and pumps. The water does not rise to the surface except in very low situations. These wells are supplied by subsoil drainage-water, and in consequence of

the ill condition of the surface around them, *many are very impure and quite unfit for use.* A large proportion of the pumps are of wood, and the excessive moisture causes them to decay rapidly. I was informed that a well could not be sunk and a good pump fixed under 12*l.* The cost of annual repairs is not less than 10 per cent., and many of the pumps are at this moment not used, some being out of repair, and in other cases because the water is bad. Many of the inhabitants are using water from polluted wells, because they have no other supply.

Mr. Symington complained that in Little Bowden a public well was polluted by the influx of the brook, and that in one or two others the supply was often very inadequate; and also that a drain was supposed to be running into a third.

I examined this well, called Falkner's Well, and found the water to emit a most offensive odour. I was informed that 16 houses had no other supply.

The Rev. R. M. Matthews, in his evidence, says—

"There is a very serious defect in Great Bowden from the want of a better supply of water. The supply is by pumps and wells chiefly. I consider the cost of putting down a pump of trifling consideration as compared with that of keeping it in condition afterward. There are two public pumps in Great Bowden, both of them useless for want of repair, and have been so for years. I have been Curate of Great Bowden 15 years, and am not aware that the pump on the Church Green has been useable during that time."

Where the houses are not thatched, but tiled, there are butts for catching rain water. The original cost of these is from 15*s.* to 20*s.*; they will last about 12 years, with frequent painting and repairs, requiring an annual sum for that and depreciation, &c. not less than 2*s.* 6*d.* to 3*s.* Then the annual cost of buckets, cans, &c., and repairs, will exceed 1*s.*, and add for the expense, trouble, and inconvenience of having to go out of doors to pump and carry in water, in all states of the weather, at all seasons of the year, and during all hours of the day, *only one penny per week*, and we obtain the following statements of account:—

	£.	s.	d.
Annual interest on capital sunk in well and pump, 12 <i>l.</i> at 5 per cent	0	12	0
Annual repairs of ditto, 10 per cent.	1	4	0
	<hr/>		
	£1	16	0

If we suppose the pump and well to supply an average of 4 houses, this will be 9*s.* each, and the argument that the pumps are already in existence is not of much weight in the ultimate cost, as will be seen. Neither is it of much advantage to the upholders of the present system to urge that thatched houses and others have no butts for rain water, because the extra

amount paid for soap where very soft water cannot be had w in order to secure cleanliness, more than counterbalance expense of the butt.

Omitting, therefore, the first cost of well and pump, we ha for each house, *paid either directly or indirectly by the tenant—*

	s.	d.
Annual maintenance, &c. of pump .	6	0
Cost, annual depreciation and repair of butt, say	2	9
Cost and annual repair of buckets and vessels	1	0
Pumping and carrying water 1d. per week, or per annum	4	4
	<hr/>	
	14	1

Equal to $3\frac{1}{4}$ d. per week per house for water; but if the should be any stoppage of the supply, during repairs of pump or from drought in summer, or frost in winter, the amo would be proportionately increased.

I shall have to allude to these figures again in estimat the cost of an improved supply of water for the district.

BURIAL GROUNDS.—It is a great advantage to the town of Market Harborough that there is no burial-ground attache to the church. The ancient church of St. Mary in Arden, situe about half a mile from the town, has a very commodious bur ground, in which the inhabitants of Market Harborough and Little Bowden have a right of interment. Both this chur yard and that of Great Bowden are, however, surcharged w water, so that graves are never more than 5 feet deep, and o not more than a yard. Improved land-drainage in the ne bourhood would draw off and prevent the entrance of muc of this water, and enable graves to be dug to a much great depth.

I was informed by the Rev. William Scarborough, and othe, that drunkenness is *not* a prevailing vice in either Market Harborough, Great or Little Bowden.

In Little Bowden there are some mud cottages, or ra hovels, quite as bad in construction as those in Great Bowden, but I was informed that they are about to be taken down. Two rows of such cottages have been recently replaced by very convenient brick dwellings, erected by the Fcoffees, and let at the moderate rent of 30s. per year each.

Market Harborough seems to be much infested with trans and vagrants. I am informed that the evil has increased late. Of the houses in which such people lodge, the Rev. W. Scarborough says, in his evidence—

"I fear that they are often overcrowded, and that they are accessory to the increase of moral as well as physical disease. I fear they are nests of immorality. I am sure that a great advantage would arise from subjecting such houses to licence and proper inspection, not only with reference to cleanliness, but so to the moral and social condition of the inmates."

In another part of his evidence, he says—

"I am sure the application of the Public Health Act will be most beneficial to the town."

D. A. Rawlins, Esq., Solicitor, concludes his evidence thus—

"I am fully convinced that the application of the Public Health Act will be generally beneficial, *and especially of service to the poorer inhabitants*, and from that conviction I have taken an active part in promoting the present inquiry."

There is no local Act of Parliament in force for paving, lighting, cleansing, watching, regulating, supplying with water, or improving either Market Harborough, Great Bowden, or Little Bowden.

LIGHTING.—The town is well lighted with gas by a private company of proprietors. The concern is not registered or enrolled.

The General Lighting and Watching Act is in force, but the inspectors employ no watchmen, because there is a station of the county constabulary force in the town.

FEOFFEES' ESTATES.—In each of the three places there is a body of Feoffees, having charge of estates bequeathed for charitable and public purposes. The 32nd Report of the Commissioners for inquiring respecting Public Charities contains full accounts of the nature of these trusts.

It will be sufficient here to state the description of the property, the annual income of each, and the objects to which it is applied.

Market Harborough Feoffment.—The feoffment of Harborough consists of lands and tenements, rent charges, and money invested, and yields an income of more than 600*l.* per annum. Taking the averages of ten years ending in 1836, the application of the funds has been in the following proportions:—

	£.	s.	d.
Relief to decayed Housekeepers	228	11	0
Repairs of the Highways.	188	15	6½
Building Expenses	195	18	5½
Premiums for Apprentices	12	11	2½
Extraordinary Relief	5	5	2½
Sundry Disbursements	25	16	5½

Total Average . . . £656 17 10½

No rates are levied in Market Harborough for repairing, cleansing, or watering highways; the whole cost is paid out of the funds of the Feoffees.

Great Bowden Feoffment.—The Feoffees of Great Bowden derive their income, amounting to nearly 100*l.* per annum from land, the rents of which are to be applied to the repair of such bridges, causeways, and highways as the inhabitants shall be liable to repair, or to contribute to repair; for repairing the parish church of Great Bowden; and for the relief of the poor inhabitants of Great Bowden.

Little Bowden Feoffment.—The income of the Little Bowden Feoffees is about 80*l.* per annum, from land and buildings. The trust directs that it shall be distributed to the poor for food, medicines, &c., and expended in apprenticing boys, children of poor inhabitants of Little Bowden. No part appears applicable to the repair of the highways, &c.

District favourable for Improvements.—The physical aspect of the district and its geological character are generally favourable for the improvements which it is the object of the Public Health Act to effect.

REMEDIES.—Manure in the solid form seems to be of little value in the district. I have already adverted to the manner in which it is accumulated, and the length of time it remains in the laystall, on the public highways, in court-yards, against the walls of houses, and on almost every spot of land uncultivated; and I have shown the evil consequences to the health of the inhabitants. From the absolute waste of all the liquid manure which drains from these heaps, it might be supposed that it was even of less value than the solid.

The fact that manures can only be applied at one period of the year is alone a sufficient proof that the land drainages effected upon erroneous principles: and it follows as a necessary consequence that after lying exposed for a considerable part of a year to the action of the sun, and wind, and rain, the manure has lost the greater portion of its fertilising properties, and is not worth the cost of carting, and of application as a dressing, at any considerable distance from the town.

THOROUGH DRAINAGE.—The remedy lies in *thorough drainage*, by means of which the excessive moisture would be drained down into underground channels, and leave the surface, so that manures could be applied, not only in the solid, but, which is infinitely better, in the liquid form, at almost any period of the year. In the course of this draining down through the soil, the fine earthy parts of the soil would be left within it, and the surface particles of the manure carried to the roots of the plants. It is this filtration, joined with the saving of the manure, that causes the productiveness of thorough drainage.

The following, from the Report of the Metropolitan Commission of Sewers on Suburban and Land Drainage, could not have been more appropriate, if written with an express reference to the district of Market Harborough:—

“1. The excess of moisture on these lands is the cause of fogs and damps.

“2. The damp serves as a medium of conveyance for any decomposing matter that may be evolved in towns, and adds to, or is the cause of, the injurious effects of such matter when breathed.

“3. The evaporation of the surplus moisture lowers temperature, produces chills, and creates or aggravates sudden and injurious changes or fluctuations of temperature, by which the health of the population is injured.”

The following are the chief advantages of drainage to the individual occupiers or owners:—

“1. The removal of the excess of moisture, which prevents the permeation of the soil by air, and obstructs the free assimilation of nourishing matters by the plants.

“2. Diminution of the resistance offered to the sinking of manures into the soil, and of the loss of manure by surface evaporation, and by being washed away during heavy rains.

“3. The prevention of lowering of the temperature, and chilling of the vegetation from diminution of the effect of solar warmth, not only on the surface of the land, but at the depths occupied by the roots of plants.

“4. The removal of the obstruction and inconvenience in the free working of the land, arising from the surface being in a state that renders it at times inaccessible, and makes it liable to be poached by cattle.

“5. The diminution of damp in the foundations of houses, cattle-sheds, and farm-steadings, which causes decay and dilapidation, as well as discomfort to inmates and cattle.”

It is abundantly proved by experience that great pecuniary advantages result from thorough land drainage, in addition to the sanitary improvement of a district. Land previously dear at 5s. per acre has, when thorough drained and subsoiled, become worth 30s. or 2l., and clay-land dear at 7s. per acre has become worth 3l., and in good localities 4l.

The cost of thoroughly draining the clay-land in the vicinity of Market Harborough with pipe-drains, 3 feet deep and 22 feet apart, would be about 5l. per acre. This being charged as an annual improvement rate or rent for 20 years, would amount only to about 7s. 6d. per year per acre. With the drains 45 feet apart and 4½ feet deep the cost would be about 4l., or an annual charge of about 6s. 2d. per acre for 20 years. The gravelly portion of the district would cost on the average about one-third less. The result of experience is, that upon these small annual payments *the return would be from 100 to 400 per cent. profit in increased quantity, and better quality of the produce.*

Increased Production from Liquid Manures.—With land drained, manure should be distributed in the liquid form because it is then immediate in its action, and easily assimilated by plants. The increase of production derivable by such system is almost incredible, especially upon grass-lands, such as those at Harborough and its neighbourhood.

At Ashby-de-la-Zouch I found that 40 or 50 acres of meadow had been drained, and manured by surface-irrigation only with the water of a brook passing through the town. This land which formerly let at 25s. per acre, is now worth 5l. per acre.

IMPROVED WATER SUPPLY.—If all the three parishes Market Harborough, Great Bowden, and Little Bowden be included in the proposed district, there will be a great choice of gathering ground for water. South of Little Bowden, on the brook which runs through the village, a small reservoir might be constructed to receive the pipe-drainage water of the agricultural land. This would, under ordinary circumstances, supply Little Bowden and Market Harborough with pure water; but, in order to provide for a period of long drought, it would raise the embankment of the present reservoir, called the Folly, situate above Market Harborough, a few feet, and at the same time widen its basin; I would cut off the drainage of the *Union Workhouse*, which now flows into the reservoir, and provide for its passage down the road in an earthenware pipe; and then, confining the Folly also to subsoil drainage water, make it subsidiary to the one already described. On account of the distance to the village of Great Bowden, it would be more economical to form a small independent reservoir, obtaining the water in a similar manner, viz., from the improved drainage of the land.

The reciprocal connection between the different branches of sanitary improvement is peculiarly seen in the advantages of water supply derived from artificial pipe-drainage.

Thorough drainage enables the rain-water to descend immediately through the soil, before any of the earthy or animal and vegetable matters at the surface have entered into chemical solution with it; while the lower soil acts perfectly in filtering from it everything in mechanical combination. Proof of this may be obtained by every one who will take the trouble to examine the transparent condition of water issuing from an agricultural tile or pipe drain. Besides this, such land-drainage water is more free from mineral impregnations than any spring-water can be; and the two-fold operation is thus accomplished of providing an abundant supply of pure water for town use, and, at the same time, of increasing the productivity of the land by extended drainage.

Provision would have to be made, by a sluice and condu

or diverting the land-drainage water past the reservoir into the nearest brook-course below during the time of dressing with manures; and also for shutting off the surface-drainage of main roads, all of which I should deal with as refuse-water.

No steam or other artificial power would be necessary for any of the works. A convenient site for the reservoir for Market Harborough and Little Bowden exists at about a mile from the river Welland, where clay for puddle and bricks could be obtained with facility. At an average depth of 15 feet the reservoir must cover about $2\frac{1}{2}$ acres, in order to contain a supply for 140 days, which is about the period of the longest drought. Such a reservoir might be constructed and a 4-inch iron main laid to the town for about 900*l*. The reservoir for Great Bowden could be constructed almost close to that village; it would scarcely need to be an acre in extent and 15 feet deep to carry through the driest season. It would cost, together with half a mile of 2-inch iron main, little more than 300*l*.

Extent of gathering-ground.—Taking the supply requisite at the rate of 125 gallons per house per diem, and the rainfall being 26,614 inches per annum, and the quantity saved from evaporation and filtered into the drainage-pipes at 11,294 inches, there will be required for the supply of Market Harborough and Little Bowden, containing together 570 houses, 102 acres of collecting ground; and for Great Bowden, containing 65 houses, 47 acres.

Arrangements for securing the gathering-ground.—It would be necessary to make arrangements for the thorough drainage of these gathering-grounds, either by taking the land, and letting it on conditions that may ensure such an occupation and cultivation as will secure its being permanently adapted to its main purpose as a gathering-ground; or by entering into such arrangements with the owners and occupiers as will effect the object. In any case the drainage should be constructed under the supervision and control of the proper local authorities; and also the arrangements should be such as to prevent any expense being incurred by the district on account of the gathering-grounds, inasmuch as the improved value from the drainage would make up for the original outlay.

These works would afford a constant supply of water in every house, for the cleansing of streets, courts, and buildings, for keeping in a sweet and healthy condition the public and private drainage, for immediately extinguishing fires, and for all other purposes for which a water supply is requisite.

In the absence of any plans and sections the cost can only be judged of proximatively. I have inspected the place and carefully considered the whole subject; and comparing it with other places where the circumstances are not much dissimilar, I have little hesitation in saying that *every cottager in the district*

may have in his house a tap constantly charged with pure water at a price not exceeding $1\frac{1}{2}d.$ per week.

Annual saving from improved supply of water.—I have already shewn, under the head of “present water supply,” that even the pumps and butts are sufficient in number, and are kept in proper repair, the cost to the poor man is really $3\frac{1}{2}d.$ per week. The saving in money, therefore, would be equal to $7s. 7d.$ per annum, besides the superiority of the supply in both quality and extent.

TOWN DRAINAGE.—The present drainage of Market Harborough is only intended to take the surface-water, and can make no claim to the term sanitary; indeed, the inefficiency of the present public drains and the stagnation of the refuse constitute the greatest defect in its local arrangements. The only useful feature in the principal drain of the town is the provision for sluices to dam up the water in case of fire. With some modification, however, I would allow this drain to remain for carrying off directly to the river the surface-water, and to prevent overflowing of the Folly pond. By so doing the deep drainage would not need to be of a large size, nor would the sewage manure be unnecessarily diluted.

The improved deep drainage of streets, courts, and houses should be entirely constructed of earthenware pipes. The largest of these need not, for the present population, be more than 9 inches in diameter; but with a view to an increase in the number of inhabitants and the permanence of the works, the *conveying* pipe for all the refuse might be 12 inches. The system of pipes would taper upward, through the minor streets, lanes, and courts, until 2-inch or 3-inch pipes would be sufficient for individual houses. I do not think there are twenty houses in Market Harborough, Great Bowden, and Little Bowden that would require pipes 4 inches in diameter.

Many of the houses could be drained by a system of *combined back-drainage* through the courts, avoiding all the expense of coming through the buildings or passages with each separate drain. All privies, waterclosets, and liquid refuse of the houses should pass into these pipes.

The depths would be such as to dry all the foundations, floors, and walls of the buildings: and, by removing rapidly all the moisture from the surface and subsoil, the atmosphere would become more dry and healthy. The large quantities of water passing through these drains, in proportion to their diameter, would force away all solid matters before decomposition took place; so that with traps at the openings, stench from drains would be almost entirely unknown. The drains for Market Harborough would all finally meet at the bottom of the Sheep-market, and pass down St. Mary's Road, below the town.

that no offensive emanations from the river might affect the population.

The deep drainage from Little Bowden might be collected together, and all pass off, excluding the flood-water, in a 6-inch pipe, to about the same point below the town; so that its noxious influence would not be felt. The village of Great Bowden is some distance from the river, and therefore its drainage, being collected, may pass by the most direct course to the river.

It must be remembered, however, that these pipes leading to the river should only be used as outlets when the suburban land cannot receive the sewage as liquid manure; or until the farmers shall have become convinced of its great fertilizing powers.

Improvement of the course of the River Welland, as connected with drainage.—In connection with the improvement of the drainage of the district, I would recommend an alteration of the course of the river Welland. Immediately below the town it has several considerable curves which, by lengthening its channel, decrease the velocity and discharge of the stream. The first of these curves between Harborough Bridge and the Railway might be easily got rid of; and then, by scouring up the bed of the stream, an increased fall would be obtained, which would tend greatly to diminish the height of the water at the town during floods. The expense of this alteration would not be great; the advantages will be obvious to every inhabitant.

The cost of public Drainage would be defrayed by a rate; but, as drains are permanent works, such rates would be temporary, while the benefits would be as lasting as the works themselves.

DISTRIBUTION OF CHARGES FOR PRIVATE IMPROVEMENTS.—The whole of the apparatus for private tenements will be defrayed by the public (that is to say, so far as the owners are willing) from the public rate; and with charges distributed over a period of not less than twenty years, payable on each particular tenement by the person who receives the benefit, except in those cases where the tenement is let to weekly tenants, or others whose rents are payable quarterly, or at shorter periods than half-yearly; in which cases the owner, being the only available person, must stand in the place of the occupier, and he must pay the improvement rate, and collect it back from his fluctuating tenantry.

Cost of Town Drainage.—Without plans and sections it is impossible to give detailed estimates; but with such evidence as I have been able to obtain, and the detailed estimates made for places which seem sufficiently to correspond with this dis-

trict, I venture to say that the public drainage charge would amount, for the working man's house, to about *one penny per week*; and the private improvement rate for house-drainage distributed over twenty years, to *three farthings per week*.

Economy of perfect Town Drainage.—As no drainage worth the name now exists, this will appear to the inhabitants of the district in the form of a new charge; but I need only recur to the evidence in the early part of this Report as to the present evil condition of a great proportion of the cottages in the district, and then to advert to the advantages of a dry and comfortable home, in order to shew its importance. One week unnecessary sickness in a year would be a greater loss in wages alone to a labouring man than the amount he will, in all probability, be called upon to pay during the year for all the sanitary improvements laid out in this Report.

APPLICATION OF THE TOWN REFUSE TO AGRICULTURE.—On further consideration suggests itself in concluding this part of my subject. Chemists have proved that the refuse of towns contains all the elements of our food, and scientific men of the greatest experience have estimated the enormous value of the refuse, when applied by hose and jet to thoroughly drained land; nay more, *experience* has already proved that land which let for 40s. to 50s. per acre is increased in value by the liquid application of town refuse to 20l. and 30l. per acre. The district of Market Harborough is very favourably situated for the agricultural distribution of its refuse; and therefore, when these arrangements for perfect drainage, &c., are *fully* carried into effect, may fairly be expected that the receipts for the application of the town excreta of the district will not only cover all the expenditure, but provide funds for further improvements.

EXTENT OF THE DISTRICT AND FORMATION OF LOCAL BOARD.—In addition to the recommendation at the commencement of this Report, viz., that Market Harborough, Great Bowden and Little Bowden be formed into one district for the purposes of the Public Health Act, I beg further to recommend that the whole of those parishes and places be respectively included within the boundaries of such district.

I also recommend that the Local Board shall consist of fifteen members, six to be elected by the rate-payers of Market Harborough, six to be elected by the rate-payers of Great Bowden and three to be elected by the rate-payers of Little Bowden.

These numbers may appear disproportionate to the inhabitants of Market Harborough because its population is double that of Great Bowden; but, while that is the case, we find that the annual value of the rateable property in Great Bowden is 7782l., and that of Harborough not more than 5661

besides which it will be seen, on reference to the plan appended, that the parish of Great Bowden encloses Harborough on three sides, and that the future increments of the town will be to a great extent within Great Bowden, so that the disparity in population will in the course of time cease to exist.

The provision in the Public Health Act that one-third of the members of the Local Board shall go out of office annually, prevents the numbers from being adjusted exactly in proportion to the population of each; but the apprehension that this will give one parish an undue weight in the decisions of the Local Board is provided for in those parts of the Act which relate to the special district rates and private improvement rates, so that each place will be called upon to pay only for its own improvements.

List of places where diseases and death had occurred.—At the commencement of this preliminary inquiry I was not furnished by the Superintendent Registrar with a list of places where epidemics and other diseases had occurred, but I am glad to say that Mr. Abbott has since given me valuable information from the registers as to the rates of mortality, the deductions from which appear in the early part of this Report.

Gentlemen who accompanied Inspector through district.—During the inspection of the district I was accompanied by the following gentlemen:—

W. De Capell Brooke, Esq., J. P.
Rev. Wm. Scarborough, M.A., incumbent.
Francis Wright, Esq., M.D.
Joseph Brown, Esq., Townsman.
W. Andrews, Esq., solicitor, feoffee.
D. A. Rawlins, Esq., solicitor.
Mr. Samuel Watson Cox.
Mr. Henry Day, feoffee and surveyor of highways.
George Seabroke, Esq., of the Grange, Great Bowden.
Mr. Joseph Harding, Great Bowden.
Mr. Thomas Flavell, Guardian of Little Bowden.
Mr. W. Symington, Overseer of ditto.
Mr. John Flavell, Churchwarden of ditto.
Mr. John Newham, feoffee of ditto.
Mr. Wm. Gilbert, secretary, gas-works.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

The following is a summary of Conclusions and Recommendations which it is my duty to lay before the General Board of Health for their consideration:—

I. That endemic diseases and a low state of health are prevalent in the district, and that epidemics occasionally burst out on confined spaces with fatal effect.

II. That the health and condition of the inhabitants would be greatly improved—

1. By the better drainage of the site of the town and villages, and of the suburban drainage area.

2. By an improvement in the course of the river Wel-land.

3. By the abolition of all privy cesspools and open stagnant pools and ditches, and the substitution of soil-pan apparatus, and covered channels to convey away the refuse and surplus water.

4. By an improved water supply carried into every house.

5. By improved surface-cleansing, and paving of courts, alleys, closes, streets, and roads.

III. That these objects may, in all probability, be accomplished at the following rates per week for each cottage house:—

Supplies of filtered water carried into each house on the constant system of complete house-drainage, including the use of soil-pan apparatus, and a drain from each house or space, at *twopence-farthing* per week, exclusive of the general sewers rate.

IV. That the town and village refuse, or sewer-water, may be applied with facility to the agricultural districts, with mutual advantage to them and to the town itself.

V. That the whole of the improvements in question will be in reduction of the *real* cost of the present defective arrangements.

VI. That, for the special reasons stated in this Report, the consolidation of existing jurisdictions by the application of the Public Health Act would be highly beneficial to the district.

VII. That the whole of the parishes of Market Harborough and Great Bowden, in the county of Leicester, and of Little Bowden, in the county of Northampton, should be united into one district for carrying out the above objects.

VIII. That the Local Board of Health should consist of 15 members, 6 to be elected by Market Harborough, 6 by Great Bowden, and 3 by Little Bowden.

I have, &c.

WILLIAM LEE.

Superintending Inspector.